

**A key to the genus *Codonopsis*, Wall.,
with an account of two undescribed species.**

BY

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With Plates CCXVI-CCXVII.

During the year 1908 there were published almost simultaneously revisions of the genus *Codonopsis*, Wall. by V. L. Komarov* and T. F. Chipp†. Since that time the genus has grown so rapidly that the number of species has been doubled while the continued exploration of Upper Burma and S.W. China by plant collectors still adds to them. It was therefore thought that a comprehensive key to the genus should be attempted. There already exist two keys (*, †), either of which could be used as a basis. In that of T. F. Chipp† the genus is divided into four groups according to the mode of attachment, relative to one another of the calyx and corolla. This division of the genus is somewhat artificial as it places clearly allied species in different groups. On the other hand the scheme of V. L. Komarov* is a more natural one, species of close affinity being retained in the same group. In this respect the latter arrangement has a distinct advantage over the former and has accordingly been followed.

Komarov divides the genus into two subgenera:—

(i.) *Pseudocodonopsis*, Kom., in which the corolla is rotate and 5-partite, the corolla being so deeply divided as almost to simulate polypetaly. The flowers are bright blue in colour and when fully open the lobes are wide spread; (ii.) *Eucodonopsis*, Kom., in which the corolla is tubulate or campanulate. This subgenus is again subdivided into two series:—A. *Volubiles*, Kom. (climbing plants); B. *Erectae*, Kom. (non-climbing plants). In this latter series the plants are either weakly erect or trailing in habit.

The genus is a very variable one comprising plants of very diverse habit showing a wide range in floral structure, shape of leaves and hairiness. This variation is further reflected in some of the species,

* Act. Hort. Petrop. xxix (1908), p. 102.

† Journ. Linn. Soc. Bot. xxxviii (1908), p. 378.

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where considerable difficulty is experienced in their demarcation. The point is well illustrated in the case of the subgenus *Pseudocodonopsis*. Here the large number of plants examined by the writer shows a remarkable gradation of form from *C. convolvulacea*, Kurz, to *C. Forrestii*, Diels. *C. convolvulacea*, Kurz, is a long glabrous climbing plant with leaves scattered throughout the length of the stem, which bears numerous one-flowered lateral peduncles. Another species is similar in habit but has flowers and leaves 2-3 times larger; this is *C. Forrestii*, Diels. The differences between typical plants of these species are obvious. There are, however, many plants intermediate in size and in not a few cases the species can only be arbitrarily determined by measurement of the flowers. On the other hand many plants are smaller in size than *C. convolvulacea*, Kurz. In some of these the leaves become aggregated towards the base of the stem which becomes elongated and bears 1-4 flowers and is non-twining. This corresponds to a species described by Lingelsheim and Borza—*C. Limprichtii*. All the forms so far mentioned are entirely glabrous but a hairy form similar to *C. Limprichtii* occurs which has, however, a twining stem—*C. Limprichtii* var. *hirsuta*, Hand.-Mzt. There also exists an extreme form having a dense cluster of linear leaves at the base of the stem—*C. Limprichtii* var. *pinifolia*, Hand.-Mzt. The wide range in habit exhibited by the plants examined—all from a small geographical area—suggests that these latter forms are all referable to *C. convolvulacea*, Kurz, as varieties. Of the other species in this subgenus, *C. vinciflora*, Kom., has formerly been included with *C. convolvulacea*, Kurz, but it is here retained as a distinct species. It can be recognised by the leaves, which are much thinner and are markedly dentate. Lastly there is *C. filamentosa*, W. W. Sm., which has broadly ovate-cordate leaves as opposed to the lanceolate leaves found in all the other species.

The variability in hairiness that may be exhibited by a species is well shown in *C. tubulosa*, Kom. In his original description Komarov describes the stem as glabrous, while Chipp adds that the stems may be hairy at the nodes. The series of plants collected by G. Forrest referable to this species contains some plants which are glabrous and others densely hirsute, the remainder showing intermediate stages. This variability in hairiness applies to stem, leaves, and in particular to the ovary, and is therefore of little diagnostic value.

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KEY TO THE SPECIES.

1. { Corolla rotate 5-partite divided to the base. 2.
1. { Corolla campanulate or tubulate 5.
2. { Leaves ovate or lanceolate or linear, margin normally entire or at most scarcely toothed, petioles short 3.
2. { Leaves broadly ovate or lanceolate, margin markedly dentate or crenato-serrate, petioles much longer 4.
3. { Leaves ovate-lanceolate or linear-lanceolate 2-5 cm. long up to 1 cm. broad, petioles short, flowers small, petals less than 3 cm. long 1. *convolvulacea*.
3. { Leaves ovate-lanceolate larger, 3-7 cm. long, 1.5-3 cm. broad, flowers large, petals more than 3 cm. long 2. *Forrestii*.
4. { Leaves ovate to lanceolate, thinner, markedly dentate 3. *vinciflora*.
4. { Leaves broadly ovate crenato-serrate, the lower deeply cordate, the upper with truncate base, lateral branches bearing numerous flowers 4. *efilamentosa*.
5. { Leaves opposite or alternate 6.
5. { Leaves crowded at apices of the lateral branches (3-4-pseudo-verticillate) 14.
6. { Stem definitely twining 7.
6. { Stem trailing or erect 17.
7. { Filaments of stamens entirely glabrous 8.
7. { Filaments of the stamens setose 16.
8. { Leaf base rounded, truncate or cordate 9.
8. { Leaf base cuneate 12. *Henryi*.
9. { Peduncles short, less than 3 cm., flowers small, corolla less than 12 mm. 10.
9. { Peduncles longer than 3 cm., flowers large 11.
10. { Flowers green, calyx lobes small, leaves lanceolate with sinuate margin 8. *affinis*.
10. { Flowers white, calyx lobes large longer than corolla, leaves ovate with serrate margin 9. *micrantha*.
11. { Peduncles naked 12.
11. { Peduncles terminal on leafy branches 13.

- { Calyx inferior divided to the base 5. *Tangshen*.
 12. { Calyx lobes large foliaceous a little shorter
 than corolla 6. *rotundifolia*.
 { Calyx lobes narrow linear much shorter than
 corolla 7. *viridis*.
13. { Corolla small up to 3 cm. 10. *silvestris*.
 { Corolla very large 3-5 cm. long 11. *Farreri*.
14. { Root fusiform, leaves large, seed winged 13. *lanceolata*.
 { Root tuberous spheroidal, leaves small, seed
 not winged 15.
15. { Leaves longer than 2 cm. 14. *ussuriensis*.
 { Leaves thinner, less than 2 cm. long, stems
 slender pilose 15. *minima*.
16. { Leaves ovate to lanceolate, more or less
 entire, with a very short petiole 16. *tubulosa*.
 { Leaves ovate to deltoid, margin irregularly
 coarsely serrate, thinner, with a dis-
 tinctly long petiole 17. *macrocalyx*.
17. { Stem leafy or subscapose 18.
 { Stem bearing many leafy branches, no
 radical leaves present 25.
18. { Stem leafy throughout its length 19.
 { Stem subscapose, leaves clustered near base 23.
19. { Filament of stamen setose 18. *Benthami*.
 { Filament of stamen entirely glabrous 20.
20. { Calyx inferior, divided to the base, lobes
 large foliaceous almost free from ovary 19. *chimaliensis*.
 { Calyx not inferior, adnate to ovary 21.
21. { Flowers axillary, leaves large deltoid 20. *delloidea*.
 { Flowers terminal leaves ovate or lanceolate 22.
22. { Leaves opposite, lanceolate or ovate, base
 rounded or attenuated, flowers dark purple 21. *purpurea*.
 { Leaves opposite or alternate, broadly ovate,
 base rounded to truncate, flowers yellow 22. *subsimplex*.
23. { Leaves large orbicular, base cordate, corolla
 very deeply lobed almost to the base 23. *rosulata*.
 { Leaves oblong-lanceolate base cuneate 24.
24. { Leaves with long petioles, flowers small 24. *subscaposa*.
 { Leaves subsessile, flower larger, corolla more
 than 3 cm. 25. *meleagris*.

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|-----|---|---|-----------------------------|
| 25. | { | Stem most often 1-flowered, subscapose, with many sterile foliaceous branches arising near the base | 26. |
| | { | Stem with numerous leafy flowering branches | 31. |
| 26. | { | Corolla globose-campanulate | 27. |
| | { | Corolla tubulate widening at the mouth | 28. |
| | { | Corolla broadly campanulate | 30. |
| 27. | { | Flowers blue, calyx glabrous, leaves small | 26. <i>foetens</i> . |
| | { | Flowers green, calyx with setose ridges, leaves larger, stem and leaves more densely pilose | 27. <i>subglobosa</i> . |
| 28. | { | Stamens glabrous, leaves large, corolla opening broadly at its mouth | 28. <i>Bulleyana</i> . |
| | { | Stamens setose, leaves small | 29. |
| 29. | { | Corolla less than 3 cm. long, filaments circ. 10 mm., leaves very small, rounded | 29. <i>thalictrifolia</i> . |
| | { | Corolla longer than 3 cm., filaments longer 16 mm., leaves larger, more densely pilose | 30. <i>mollis</i> . |
| 30. | { | Leaves pubescent, calyx lobes broad, ciliated | 31. <i>ovata</i> . |
| | { | Leaves glabrous, calyx lobes linear, glabrous | 32. <i>dicentrifolia</i> . |
| 31. | { | Leaf margin sinuate | 33. <i>viridifolia</i> . |
| | { | Leaf margin entire | 32. |
| 32. | { | Leaf margin not thickened | 34. <i>clematidea</i> . |
| | { | Leaf with thickened white margin | 35. <i>cardiophylla</i> . |

The following species have not been seen and therefore have not been included in the key :—

36. *Draco*. 37. *japonica*. 38. *Kawakamii*. 39. *tsinlingensis*.

Subgenus 1. *Pseudocodonopsis*, Kom.

Corolla rotata ad basin usque 5-partita, ovarium fere inferum, capsula obconica.

1. **C. convolvulacea**, Kurz, in Journ. Bot. xi (1873), p. 195.

C. Limprichtii, Lingel. et Borza in Fedde, Repert, xiii (1914), p. 391.

C. graminifolia, Lévl. in Cat. Pl. Yunnan (1915), p. 24.

BURMA.

CHINA. Yunnan, Szechuan.

The plants included within this species show a remarkable gradation in form. The typical form is a long twining plant, glabrous, with

leaves scattered throughout the length of the stem, the lower oval the upper ovate-lanceolate with short petioles. There are numerous lateral one-flowered peduncles. Lingelsheim and Borza describe a form *C. Limprichtii*, which has a short erect (not climbing) stem. The leaves are aggregated towards the base of the stem, the lower oval the upper lanceolate. The peduncle is terminal with 1-4 flowers. A third form *C. Limprichtii* var. *hirsuta*, Hand.-Mzt. resembles the previous one but differs in that the stem and underside of the leaves bear long dense setae. Lastly there is a further form which has no basal oval leaves. The leaves are linear and clustered at the base of the stem while the peduncle is terminal, climbing and 1-4-flowered.

Among the plants examined there are besides these described forms many that are intermediate. The whole range of forms is therefore included within this species and distinguished as varieties as follows :—

A. Leaves of two kinds—lower oval, upper ovate-lanceolate to lanceolate.

(a) Stem 20-60 cm. twining, leaves scattered throughout the entire length of stem which bears numerous one-flowered lateral peduncles var. *typica*, var. nov.

(b) Stem 10-20 cm. erect, leaves clustered at the base, glabrous, with a terminal peduncle 1-4-flowered var. *Limprichtii* (Lingel. et Borza pro sp.)

(c) Stem up to 30 cm. twining, leaves aggregated towards the base, stem and underside of leaves densely covered with long setae, peduncle terminal 1-4-flowered var. *hirsuta*, Hand.-Mzt.

B. Leaves all linear, clustered at the base of stem, peduncle terminal, twining, 1-4-flowered var. *pinifolia*, Hand.-Mzt.

Specimens noted :—

var. *typica*, Anth.

Henry 9425. Maire 283, 949, 1446. Forrest 11933. Ward 96.
MacGregor 67. Lace 5516.

var. *Limprichtii* (Lingelsh. et Borza), Anth.

Forrest 886, 2732, 3851, 6277. Maire 294.

var. *hirsuta*, Hand.-Mzt.

Forrest 11180.

var. *pinifolia*, Hand.-Mzt.

Hand.-Mzt. 10053. Forrest 11179, 11516, 13134.

2. **C. Forrestii**, Diels in Notes Roy. Bot. Gard. Edin., v (1912), p. 171.
C. Mairei, Lévl. in Cat. Pl. Yunnan (1915), p. 24.

CHINA. Yunnan.

Forrest 48, 3852, 6706, 7079, 11178, 22281. Hand.-Mzt. 4917.

This plant is perhaps a large more robust form of *C. convolvulacea*, Kurz. The leaves are much larger and the flowers 2-3 times greater than those of that species. It is by these characters that this species is distinguished.

3. **C. vinciflora**, Kom. in Act. Hort. Petrop. xxix (1908), p. 103, tab. ii, fig. 4.
C. convolvulacea, Chipp, Wilson 3986 in Journ. Linn. Soc. Bot. xxxviii (1908), p. 289, non Kurz.

CHINA. Szechuan, Tibet.

Tibet. Sengna, Kanj chung. Alt. 11,700 ft. 23/8/24. Bailey sine no.

This species may easily be distinguished from *C. convolvulacea*, Kurz, by its much thinner, markedly dentate leaves and longer petioles.

4. **C. efilamentosa**, W. W. Sm. in Notes Roy. Bot. Gard. Edin., viii (1913), p. 107.

CHINA. Yunnan.

The type of this species is somewhat immature, further material showing that the diagnosis is in consequence of this defective in certain points. It may be well to emend it as follows:—

Planta scandens, 60-150 cm. longa. Caules volubiles glabri. Folia alterna, rarius superne opposita, ad 4.5 cm. longa, ad 3.5 cm. lata, late ovata, basi alte et aequaliter cordata, minora saepe rotundata, acuta vel subacuta, margine obtusissime sinuato-dentata, utraque facie glabra, supra viridia nervis obscuris, infra glaucescentia nervis paulo eminentibus; petioli 1 cm. longi vel paulo ultra, glabri. Flores terminales et axillares, satis numerosi; pedunculi glabri ad 3 cm. longi. Calyx superus; tubus obconicus glaber 4-6 mm. longus; lobi sinu acuto sejuncti, triangulari-ovati, acuti vel subacuti, glabri, circ. 1 cm. longi, circ. 4 mm. lati. Corolla rotata caerulea, usque ad basin in lobos quinque lanceolatos subacutos 20-25 mm. longos, 8-15 mm. latos sub anthesi late patentes divisa. Staminum filamenta brevia circ. 3 mm. longa, parte inferiore late et abrupte triangulariter-dilatata margine dense pilosa, parte superiore gracili glabra; antherae

circ. 4 mm. longae. Stylus glaber vix 2 mm. longus; stigma latum trilobum. Capsula obconica circ. 2 cm. longa; valvae 3. Semina brunnea circ. 2 mm. longa 1 mm. lata.

Forrest 6258, 22275, 22332. Rock 5476.

This species in its deep cleft corolla is allied to *C. convolvulacea*, Kurz, from which it may easily be distinguished by the numerous flowers borne on the lateral peduncles and by its broadly ovate leaves, the lower deeply cordate the upper truncate, with dentate-sinuate margin and long petioles.

Subgenus II. Eucodonopsis, Kom.

Corolla late vel tubuloso-campanulata parum incisa, ovarium semi-superum, capsula lata basi subhemisphaerica supra conoidea.

Series i. Volubiles, Kom.

Subseries A. Folia alterna vel opposita bina, corolla campanulata.

5. **C. Tangshen**, Oliver in Hook. f. Icon. Pl. xx (1891), tab. 1966.

CHINA. Hupeh.

6. **C. rotundifolia**, Royle, Ill. Bot. Himal. p. 254, tab. 62.

C. lurida, Lindl. in Bot. Reg. (1839), Misc. 82.

Wahlenbergia rotundifolia, A. DC. Prodr. vii, p. 425.

Wahlenbergia lurida, Schouw Hort. Haun. apud Linnaea, xxiv (1851), p. 161.

INDIA. Kashmir, Chamba, Bashahr.

7. **C. viridis**, Wall. in Roxb. Fl. Ind. ed. Carey, ii, p. 103.

Campanula viridis, Spreng, Syst. iv, Cur. Post. p. 78.

Wahlenbergia viridis, A. DC. Prodr. vii, p. 425.

INDIA. Nepal.

var. **hirsuta**, Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 386.

C. Griffithii, Clarke in Hook. f. Fl. Brit. Ind. iii, p. 431.

INDIA. Khasia.

8. **C. affinis**, Hook. f. et T. in Journ. Linn. Soc. ii (1858), p. 12.

INDIA. Sikkim.

9. **C. micrantha**, Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 382.

CHINA. Yunnan, Szechuan.

Ducloux 513. Maire 754. Hand.-Mzt. 5231.

10. **C. silvestris**, Kom. in Act. Hort. Petrop. xviii (1901), p. 425.

Campanumoea pilosula, Franch., Pl. Dav. i (1884), p. 192.

C. rotundifolia, Hand.-Mzt. Iter. Sinense 1914-18, No. 4777 non Royle.

CHINA. Yunnan.

11. **C. Farreri**, Anth. sp. nov. Plate CCXVI.

Species ex affinitate *C. rotundifoliae*, Royle, a qua ramis numerosioribus, floribus multo maioribus facile distinguenda.

Herba procumbens vel volubilis trifarie ramosissima glaberrima 60-120 cm. attingens. Caulis pro genere crassus teres, basi 4 mm. diametro; rami alterni 15-30 cm. longi saepissime florem solitarium gerentes; ramuli ultimi 4-6-foliati, foliis oppositis vel pseudoverticillatis. Folia opposita vel alterna magnitudine atque figura variabilia, ovata, lanceolata, vel elliptica 5-20 mm. longa 5-15 mm. lata margine integra apice subacuta vel subobtusata basi in petiolum 10-15 mm. longum attenuata vel rotundata. Flores solitarii terminales pedunculo 5 cm. longo suffulti; calycis tubus 3 mm. longus lobis oblongo-lanceolatis plus minusve integris 20 mm. longis 5 mm. latis; corolla late-campanulata galbina saturate purpureo-venosa tubo 20-35 mm. longo lobis late triangularibus subobtusis 12-16 mm. longis 13-20 mm. latis; staminum filamenta basi dilatata 6 mm. longa, antherae lineares 5-7 mm. longae; ovarium stylo brevi stigmate late trilobato.

BURMA. "Chimili valley. Plant attaining 3-4 ft. Twines elegantly up the culms of the bamboos in the uppermost alpine woodland. Flower yellow, heavily veined and flushed in the lobes with claret colour. Alt. 11,000 ft. 31st July 1919." Farrer 1144.

"Western flank of the Chimili, N'Maikha-Salween divide. Lat. 26° 23' N. Long. 98° 48' E. Trailing plant of 2-4 ft. Flowers greenish yellow, veined, and netted deep purple. Amongst and on grass in lush meadows. Alt. 11-12,000 ft. August 1924." Forrest 24885. Plate CCXVI.

"W. flank of the N'Maikha-Salween divide. Lat. 26° 24' N. Long. 98° 48' E. Weakly clambering plant of 2-3 ft. Flowers greenish-yellow, marbled, and veined maroon. Amongst grass on the margins of scrub. Alt. 12,000 ft. June 1925." Forrest 26973.

This species may readily be distinguished from the other members of the *rotundifolia* group by its very much larger flowers which are borne terminally on lateral branchlets.

Subseries B. Folia alterna opposita vel pseudo-verticillata terna quaterna, corolla campanulata.

12. **C. Henryi**, Oliver in Hook. Icon. Pl. xx (1891), tab. 1967.

CHINA. Hupeh.

13. **C. lanceolata**, Benth. et Hook. f. Gen. Plant. ii (1876), p. 557.

Glossocomia lanceolata, Max. No. 100 in Mél. Biol. vi, p. 268.

Glossocomia hortensis, Rupr. in Bull. Phys.-Math. Acad.

Pétersb. xv (1857), p. 209.*

Campanumoea lanceolata, Sieb. et Zucc. Fl. Jap. i, p. 174, tab. 91.

Campanumoea japonica, Sieb. et Morr. Belg. Hort. (1863), p. 337.

Codonopsis Bodinieri, Lév. in Fl. du Kouy-Tchéou (1914-15), p. 57.

CHINA. Hupeh.

14. **C. ussuriensis**, Hemsl. in Journ. Linn. Soc. Bot. xxvi (1889), p. 6.

C. lanceolata var. *ussuriensis*, Trautv. in Act. Hort. Petrop. vi (1879), p. 47.

Glossocomia ussuriensis, Rupr. et Maxim. in Bull. Phys.-Math. Acad. Pétersb. xv (1857), p. 209.

Glossocomia lanceolata, Max. in Mél. Biol. xii, p. 487.

CHINA. Manchuria.

15. **C. minima**, Nakai in Bot. Mag. Tokyo, xxix (1915), p. 7.

KOREA.

Subseries C. Folia alterna vel bina, corolla tubulosa.

16. **C. tubulosa**, Kom. in Act. Hort. Petrop. xxix (1908), p. 112, tab. 2, fig. 3.

C. accrescenticalyx, Lév. in Cat. Pl. Yunnan (1915), p. 24.

C. pilosa, Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 388.

C. macrocalyx, var. *coerulescens*, Hand.-Mzt. in Sonderabd. aus Anzeig. Akad. Wein, No. 20 (1924), p. 8.

UPPER BURMA.

CHINA. Yunnan, Szechuan.

This species is distinguished by its normally ovate-lanceolate leaves which are borne on a very short petiole, these characters being constant. On the other hand the species may be glabrous or more or less pilose. This variation occurs in the case of the ovary and style, and on account of this *C. pilosa*, Chipp, has been included within the species. The

* vel *C. ussuriensis*, vide Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 381.

calyx though generally small varies in size and is thus of little diagnostic value. For this reason *Hand.-Mzt.* 9618, is also placed with this species which it corresponds with in the leaf-shape and short petiole, rather than as a variety of *C. macrocalyx*, Diels, as proposed by Dr. Handel-Mazzetti.

Forrest 3853, 7098, 8356, 10791, 21991, 22075, 22086.

Hand.-Mzt. 9618. Henry 10167. Howell 267.

Maire 346, 556, 569, 869, 997. Ward 1864.

17. ***C. macrocalyx***, Diels in Notes, Roy. Bot. Gard. Edin., v (1912), p. 170.

UPPER BURMA.

CHINA. Yunnan.

The calyx of this species is usually large and foliaceous but may be quite small. A constant feature which distinguishes it from the preceding species is the large triangular, flaccid, irregularly serrated leaves, glaucous below, which are borne on a long petiole.

Forrest 3008, 8954, 12797, 14630. Ward 1106, 1116.

var. ***parviloba***, Anth. var. nov.

A typo foliis flaccidis late triangularibus, calycis lobis minoribus differt.

CHINA. W. Yunnan.

"Twining plant of 3-4 ft. Flowers light yellowish-green marked maroon towards base. On grass and scrub in dry open situations on the eastern flank of the Tali range. Lat. 25° 40' N. Alt. 9-10,000 ft. July 1906." Forrest 3854.

"Plant of 14-20 inches. Flowers dull yellowish-green. Amongst grass and mixed herbage on stony slopes. Shweli-Salween divide. Lat. 25° 48' N. Long. 98° 48' E. Alt. 10-11,000 ft. July 1924." Forrest 24723.

"Twining herb growing to length of many feet; sprawling and twining amongst bushes in open thickets by stream, edge of rain forest amongst bamboos, etc. Alt. 8000 ft. Flowers pale yellowish-green, speckled inside with purple. 8/6/14." F. K. Ward 1655.

At first sight this variety might be mistaken for a form of *C. tubulosa*, Kom., which it resembles in the size of the calyx; but on account of its thinner leaves, broadly triangular in outline, glaucous below, with coarsely irregularly serrated margin and long petioles it is undoubtedly a form of the present species.

Series ii. Erectae, Kom.

Caule erecto scaposo vel foliato vel subscandente (non volubili).

18. **C. Benthami**, Hook. f. et T. in Journ. Linn. Soc. ii (1858), p. 14.

INDIA. Sikkim.

19. **C. chimiliensis**, Anth. sp. nov. Plate CCXVII.

Species affinis *Codonopsidi Benthami*, Hook. f. et Thoms. a qua glabritate, calyce infero magis foliaceo, corolla late campanulata differt.

Herba erecta ramosa glaberrima 60–90 cm. alta. Caulis angulosus basi 7 mm. diametro. Folia alterna ovato-lanceolata vel late lanceolata 5–14 cm. longa 3–7 cm. lata margine plus minusve crenato-serrata apice gradatim acuminata basi in petiolum 5–20 mm. longum abrupte attenuata. Flores maiores terminales pedunculo 10–15 cm. longo suffulti; calyx inferus fere ad basin divisus lobis oblongo-lanceolatis acutis integris 20–30 mm. longis 6–10 mm. latis; corolla late campanulata lacteo-lutea leviter purpureo-venosa tubo 20 mm. longo 30 mm. diametro lobis triangularibus obtusis 12–15 mm. longis 12 mm. latis; staminum filamenta linearia 6 mm. longa; antherae lineares 8 mm. longae; ovarium 14 mm. diametro stylo brevi 5 mm. stigmate magno late trilobato.

N. E. UPPER BURMA. "Western flank of the Chimili, N'Maikha-Salween divide. Lat. 26° 23' N. Long. 98° 48' E. Alt. 11–12,000 ft. Plant of 2–3 ft. Flowers pale creamy-yellow faintly veined purple flushed rose in bud. Amongst heavy grass and dwarf scrub on open alpine slopes. August 1924." Forrest 24887. Plate CCXVII.

"W. flank of the N'Maikha-Salween divide. Lat. 26° 24' N. Long. 98° 48' E. Plant of 2–4 ft. Flowers dull green flushed purplish. Amongst lush pasture on rocky slopes in side valleys. Alt. 11,000 ft. July 1925." Forrest 26998.

"W. flank of the N'Maikha-Salween divide. Lat. 26° 16' N. Long. 98° 48' E. Plant of 16–30 inches. Flowers pale greenish-white faintly lined and flushed purplish on exterior. Lush meadows on the margins of scrub. Alt. 13,000 ft. Sept. 1925." Forrest 27223.

This is quite a distinct species which is allied to *C. Benthami*, Hook. f. et Thoms. It is easily distinguished from the latter by its inferior calyx, which recalls that of *C. Tangshen*, Oliver, and by the broadly campanulate corolla.

20. **C. deltoidea**, Chippin Journ. Linn. Soc. Bot. xxxviii (1908), p. 387.

CHINA. Mt. Omi.

21. **C. purpurea**, Wall. in Roxb. Fl. Ind. ed. Carey, ii, p. 105.
Campanula purpurea, Spreng, Syst. iv, Cur. Post. p. 78.
Wahlenbergia purpurea, A. DC. Prodr. vii, p. 425.

INDIA. Nepal, Khasia.

CHINA. Yunnan.

"Eastern flank of the Tali range. Lat. 25° 40' N.; Alt. 9–10,000 ft. Weakly erect plant of 2–2½ ft. Flowers deep maroon. In heavy pastures. September 1910." Forrest 6818.
Not previously recorded from China.
22. **C. subsimplex**, Hook. f. et T. in Journ. Linn. Soc. ii (1858), p. 16.

INDIA. Sikkim.

CHINA. Tibet.
23. **C. rosulata**, W. W. Sm. in Notes, Roy. Bot. Gard. Edin., xiii (1921), p. 157.

CHINA. Szechuan.
24. **C. subscaposa**, Kom. in Act. Hort. Petrop. xxix (1908), p. 114, tab. 2, fig. 1 and 2.

CHINA. Szechuan.
25. **C. meleagris**, Diels in Notes, Roy. Bot. Gard. Edin., v (1912), p. 172.

CHINA. Yunnan.
26. **C. foetens**, Hook. f. et T. in Journ. Linn. Soc. ii (1858), p. 16.

INDIA. Sikkim.

CHINA. Yunnan. Ward 959.
27. **C. subglobosa**, W. W. Sm. in Notes, Roy. Bot. Gard. Edin., viii (1913), p. 108.

CHINA. Yunnan, Szechuan.
28. **C. Bulleyana**, Forrest ex Diels in Notes, Roy. Bot. Gard. Edin., v (1912), p. 171.
Cyananthus Mairei, Lévl. in Cat. Pl. Yunnan (1915), p. 25.

CHINA. Yunnan, Tibet.

29. **C. thalictrifolia**, Wall. in Roxb. Fl. Ind. ed. Carey, ii, p. 106.

Glossocomia thalictrifolia, Wall. Cat. n. 1297.

Glossocomia tenera, D. Don, Prod. Fl. Nepal, p. 158.

Wahlenbergia thalictrifolia, A. DC. Prodr. vii, p. 425.

Campanula thalictrifolia, Spreng. Syst. iv, Cur. Post., p. 77.

INDIA. Sikkim.

30. **C. mollis**, Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 381.

CHINA. Tibet.

There has recently been sent to the Herbarium, Royal Botanic Garden, Edinburgh, further material of this plant collected by Capt. Bailey on Goker-la, on 17/8/24, at an altitude of 14,000 ft. In this specimen the stem attains a length of about 100 cm. and bears 1-3 flowers.

31. **C. ovata**, Benth. in Royle, Ill. Bot. Himal., p. 253, tab. 69.

Wahlenbergia Roylei, A. DC. in Prodr. vii, p. 425.

INDIA. Kashmir.

Under this species *C. clematidea* is frequently included. The amalgamation of these two distinct plants is not easy to understand as the figure accompanying the original description of *C. ovata* in Royle's Ill. Bot. Himal. is very different from the figure of *C. clematidea* in Gartenflora 1856, p. 226, tab. 167. Komarov in Act. Hort. Petrop. xxix (1908), p. 155, distinguishes these plants thus:—

"*C. ovata*, Benth.—a plant, first described by Royle from Kashmir and, as cultivated in gardens, perfectly constant, with a fusiform fleshy one-headed (unipetern) root, a short (15-20 cm.) ascending stem 1-2-flowered, adnate at the base to slender sterile branches with many opposite leaves; leaves pilose ovate somewhat obtuse entire, flower tubular-campanulate, calyx lobes triangular with ciliate margins.

"Later diagnoses, in addition to *C. ovata* collected and described by Royle himself, describe another plant with stem branching from the base, with several branches up to a metre high, almost all fertile with slender leafy branches, leaves much larger, calyx lobes ovate-oblong corolla globose-campanulate larger. Apparently these plants (which in cultivation are constantly distinct) are specifically different—the one must be called *C. ovata*, Benth. the other *C. clematidea*, Clarke.

"*C. ovata*, Benth., as I take it, is an alpine or subalpine meadow plant of low growth, with small subtomentose leaves, one-flowered peduncles with white setulose scattered hairs, subscapose stem generally bibracteate with bracts leafy lanceolate acute, branchlets setulose, leafy, very like those of *C. thalictrifolia*, corolla tubulate or broadly open-campanulate."

32. **C. dicentrifolia**, W. W. Sm. in Rec. Bot. Surv. Ind. iv (1913), p. 388.
Wahlenbergia (?) *dicentrifolia*, C. B. Clarke in Hook. f. Fl. Brit.
 Ind. iii, p. 430.

INDIA. Sikkim.

33. **C. viridiflora**, Maxim. in Bull. Acad. Pétersb. xxvii (1881), p. 496.

CHINA. Kansu.

34. **C. clematidea**, C. B. Clarke in Hook. f. Fl. Brit. Ind. iii, p. 433.
Wahlenbergia clematidea, Schrenk, Enum. Pl. Soong. v, p. 38.
Glossocomia clematidea, Fisch. in Regel, Gartenflora (1856),
 p. 266, tab. 167, fig. 2.

INDIA. Kashmir.

35. **C. cardiophylla**, Diels ex Kom. in Act. Hort. Petrop. xxix (1908),
 p. 117.

CHINA. Hupeh, Tibet.

Wilson 2381. Ward 77, 762, 1074, 1100. Forrest 14398, 14659,
 18949.

A plant of uncertain origin cultivated in the Royal Botanic Garden,
 Edinburgh, is referable to this species.

Species not seen :—

36. **C. Draco**, Pampan. in Nuov. Giorn. Bot. Ital. xvii (1910), p. 733.
 37. **C. japonica**, Miq. in Ann. Mus. Bot. Lugd.-Bat. ii, p. 192.
 38. **C. Kawakamii**, Hayata in Journ. Coll. Sc. Tokyo, xxx, Art. i (1911),
 p. 165.
 39. **C. tsinlingensis**, Pax et K. Hoffm. in Fedde, Repert. Spec. Nov.,
 Beihefte, xii (1922), p. 500.

Index to Species and Synonyms.

- Campanula purpurea*, Spreng. Syst. iv Cur. Post., p. 78 = *Codonopsis*
purpurea, Wall.
Campanula thalictrifolia, Spreng. loc. cit., p. 77 = *Codonopsis thalictri-*
folia, Wall.
Campanula viridis, Spreng. loc. cit., p. 78 = *Codonopsis viridis*, Wall.
Campanumoea japonica, Sieb. et Morr. Belg. Hort. (1863), p. 337 =
Codonopsis lanceolata, Benth. et Hook. f.

- Campanumoea lanceolata*, Sieb. et Zucc. Fl. Jap. i, p. 174, tab. 91 =
Codonopsis lanceolata, Benth. et Hook. f.
- Campanumoea pilosula*, Franch. Pl. David. i (1884), p. 192 =
Codonopsis silvestris, Kom.
- Codonopsis accrescenticalyx*, Lévl. in Cat. Pl. Yunnan (1915), p. 24 =
Codonopsis tubulosa, Kom.
- Codonopsis affinis*, Hook. f. et Thoms., p. 180.
- Codonopsis albiflora*, Griff. Notul. iv, 279 = *Campanumoea celebica*,
 Blume
- Codonopsis Benthami*, Hook. f. et Thoms., p. 184.
- Codonopsis Bodinieri*, Lévl. in Fl. du Kouy-Tchéou (1914-15), p. 57 =
Codonopsis lanceolata, Benth. et Hook. f.
- Codonopsis Bulleyana*, Forrest, p. 185.
- Codonopsis cardiophylla*, Diels, p. 187.
- Codonopsis cashmeriana*, Royle, Ill. Bot. Himal., 450, Sphalm. =
Campanula cashmiriana, Royle
- Codonopsis celebica*, Miq. Fl. Ind. Bat. ii, 566 = *Campanumoea celebica*,
 Blume
- Codonopsis chimiliensis*, Anth., p. 184.
- Codonopsis clematidea*, Clarke, p. 187.
- Codonopsis convolvulacea*, Kurz, p. 177.
- Codonopsis cordata*, Hassk. in Retzia i, 9 = *Campanumoea javanica*,
 Blume
- Codonopsis cordifolia*, Kom. in Act. Hort. Petrop. xxix (1908), p. 108 =
Campanumoea javanica, Blume
- Codonopsis deltoidea*, Chipp, p. 184.
- Codonopsis dicentrifolia*, W. W. Sm., p. 187.
- Codonopsis Draco*, Pampan., p. 187.
- Codonopsis efilamentosa*, W. W. Sm., p. 179.
- Codonopsis foetens*, Hook. f. et Thoms., p. 185.
- Codonopsis Farreri*, Anth., p. 181.
- Codonopsis Forrestii*, Diels, p. 179.
- Codonopsis gracilis*, Hook. f. et Thoms. Ill. Himal. Pl. tab. 16A =
Leptocodon gracilis, Hook. f. et Thoms.
- Codonopsis graminifolia*, Lévl. in Cat. Pl. Yunnan (1915), p. 24 =
Codonopsis convolvulacea, Kurz
- Codonopsis Griffithii*, Clarke in Hook. f. Fl. Brit. Ind. iii, p. 431 =
Codonopsis viridis, var. *hirsuta*, Chipp
- Codonopsis Henryi*, Oliver, p. 182.
- Codonopsis inflata*, Hook. f. et Thoms. in Journ. Linn. Soc. ii (1858),
 p. 13 = *Campanumoea inflata*, Clarke
- Codonopsis japonica*, Miq., p. 187.
- Codonopsis javanica*, Hook. f. et Thoms. Ill. Himal. Pl. tab. 16B =
Campanumoea javanica, Blume
- Codonopsis Kawakamii*, Hayata, p. 187.
- Codonopsis lanceolata*, Benth. et Hook. f., p. 182.

- Codonopsis lanceolata*, var. *ussuriensis*, Trautv. in Act. Hort. Petrop. vi (1879), p. 47 = *Codonopsis ussuriensis*, Hemsl.
- Codonopsis leucocarpa*, Miq. Fl. Ind. Bat., ii, 565 = *Campanumoea celebica*, Blume
- Codonopsis Limprichtii*, Lingelsh. et Borza, in Fedde, Repert. xiii (1914), p. 391 = *Codonopsis convolvulacea*, Kurz, var. *Limprichtii*, Anth.
- Codonopsis lurida*, Lindl. in Bot. Reg. (1839), Misc. 82 = *Codonopsis rotundifolia*, Royle
- Codonopsis macrocalyx*, Diels, p. 183.
- Codonopsis Mairei*, Lévl. in Cat. Pl. Yunnan (1915), p. 24 = *Codonopsis Forrestii*, Diels
- Codonopsis meleagris*, Diels, p. 185.
- Codonopsis micrantha*, Chipp, p. 180.
- Codonopsis minima*, Nakai, p. 182.
- Codonopsis mollis*, Chipp, p. 186.
- Codonopsis ovata*, Benth., p. 186.
- Codonopsis parviflora*, Wall. Cat. n. 1300 = *Campanumoea parviflora*, Benth. et Hook. f.
- Codonopsis pilosa*, Chipp in Journ. Linn. Soc. Bot. xxxviii (1908), p. 388 = *Codonopsis tubulosa*, Kom.
- Codonopsis purpurea*, Wall., p. 185.
- Codonopsis rosulata*, W. W. Sm., p. 185.
- Codonopsis rotundifolia*, Royle, p. 180.
- Codonopsis silvestris*, Kom., p. 181.
- Codonopsis subglobosa*, W. W. Sm., p. 185.
- Codonopsis subscaposa*, Kom., p. 185.
- Codonopsis subsimplex*, Hook. f. et Thoms., p. 185.
- Codonopsis Tangshen*, Oliver, p. 180.
- Codonopsis thalictrifolia*, Wall., p. 186.
- Codonopsis truncata*, Wall. Cat. n. 1301 = *Campanumoea celebica*, Blume
- Codonopsis tsinlingensis*, Pax et K. Hoffm., p. 187.
- Codonopsis tubulosa*, Kom., p. 182.
- Codonopsis ussuriensis*, Hemsl., p. 182.
- Codonopsis vinciflora*, Kom., p. 179.
- Codonopsis viridiflora*, Maxim., p. 187.
- Codonopsis viridis*, Wall., p. 180.
- Cyananthus Mairei*, Lévl. in Cat. Pl. Yunnan (1915), p. 25 = *Codonopsis Bulleyana*, Forrest
- Glossocomia clematidea*, Fisch. in Regel, Gartenflora (1856), p. 266, tab. 167, fig. 2 = *Codonopsis clematidea*, C. B. Clarke
- Glossocomia hortensis*, Rupr. in Bull. Phys.-Math. Acad. Pétersb. xv (1857), p. 209 = *Codonopsis lanceolata*, Benth. et Hook. f., vel *Codonopsis ussuriensis*, Hemsl.
- Glossocomia lanceolata*, Regel in Maxim. Mél. Biol. vi, p. 268 = *Codonopsis lanceolata*, Benth. et Hook. f.

- Glossocomia lanceolata*, Regel, Fl. Ussur. n. 316 in Maxim. Mém. Biol. xii, p. 487 = *Codonopsis ussuriensis*, Hemsl.
- Glossocomia tenera*, D. Don, Prod. Fl. Nepal, p. 158 = *Codonopsis thalictrifolia*, Wall.
- Glossocomia thalictrifolia*, Wall. Cat. n. 1297 = *Codonopsis thalictrifolia*, Wall.
- Glossocomia ussuriensis*, Rupr. et Maxim. in Bull. Phys.-Math. Acad. Pétersb. xv (1857), p. 209 = *Codonopsis ussuriensis*, Hemsl.
- Wahlenbergia clematidea*, Schrenk, Enum. Pl. Soong. v, p. 38 = *Codonopsis clematidea*, C. B. Clarke
- Wahlenbergia* (?) *dicentrifolia*, C. B. Clarke in Hook. f. Fl. Brit. Ind. iii, p. 430 = *Codonopsis dicentrifolia*, W. W. Sm.
- Wahlenbergia lurida*, Schouw Hort. Haun. apud Linnaea, xxiv (1851), p. 161 = *Codonopsis rotundifolia*, Royle
- Wahlenbergia purpurea*, A. DC. in Prodr. vii, p. 425 = *Codonopsis purpurea*, Wall.
- Wahlenbergia rotundifolia*, A. DC. loc. cit. = *Codonopsis rotundifolia*, Royle
- Wahlenbergia Roylei*, A. DC. loc. cit. = *Codonopsis ovata*, Benth.
- Wahlenbergia thalictrifolia*, A. DC. loc. cit. = *Codonopsis thalictrifolia*, Wall.
- Wahlenbergia viridis*, A. DC. loc. cit. = *Codonopsis viridis*, Wall.



Codonopsis Farreri, Anth.

